

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

Chemical analyses of granitic rocks in the Reno 1° by 2° quadrangle and in the northern Pine Nut
Mountains, west-central Nevada

by

David A. John¹

Open-File Report 92-246

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¹Menlo Park, California

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Chemical analyses of granitic rocks in the Reno 1° by 2° quadrangle and in the northern Pine Nut Mountains, west-central Nevada

Abstract

This paper reports 100 new major and trace element chemical analyses of granitic rocks collected in the Reno 1° by 2° quadrangle and in the northern part of the Pine Nut Mountains in the Walker Lake 1° by 2° quadrangle, west-central Nevada. The samples were collected during the Reno quadrangle project of Conterminous United States Mineral Assessment Program (CUSMAP) and during the U.S. Geological Survey Reno Field Office centerpiece project, and these analytical data are discussed and interpreted in reports that describe the geology and mineral resources of these project areas.

Introduction

As part of geologic and mineral resource assessment studies of the Reno 1° by 2° quadrangle, Nevada and California, and of an irregular area in west-central Nevada and eastern California, 100 samples of granitic plutons were collected for chemical, petrographic, geochronologic, and strontium isotope studies. Most of the samples were collected in the eastern two-thirds of the Reno quadrangle with 5 samples collected in the northern Pine Nut Mountains along the northern edge of the Walker Lake 1° by 2° quadrangle (fig. 1). This paper presents major and trace element chemical data for this suite of samples. Interpretation and discussion of these data are presented in reports on the geology and mineral resources of the Reno quadrangle and the Reno Field Office centerpiece project study area (John, Stewart, and others, in press; John, Schweickert, and Robinson, in press).

Analytical Methods

Samples of unweathered rock collected from natural outcrops were analyzed. All samples were collected by D.A. John, except nos. 96-100 (tables 1 and 2) which were collected by G.B. Sidder. Major elements were analyzed by wavelength-dispersive X-ray fluorescence spectroscopy (Taggart and others, 1987), and minor elements (Ba, Ce, Cr, Cu, La, Nb, Ni, Rb, Sr, Y, Zn, and Zr) were analyzed by energy-dispersive X-ray fluorescence spectroscopy (K-Ar; Johnson and King, 1987). FeO, H₂O⁺, H₂O⁻, CO₂, and F were determined by conventional wet chemical methods (Jackson and others, 1987). All analyses were performed by U.S. Geological Survey laboratories in Menlo Park, CA., Lakewood, CO., and Reston, VA. Analysts were A. Bartel, L. Bradley, M. Dyslin, N.H. Elsheimer, J. Evans, J. Kent, C. Papp, B. Powsner, S.T. Pribble, J. Sharkey, D.F. Siems, K. Slaughter, and J.E. Taggart.

Results

Chemical analyses are presented in table 1. Major oxides are recalculated to 100 percent volatile-free. Table 2 gives sample locations, pluton name (if any), brief petrographic descriptions, and isotopic age data where available. Rock names are IUGS classification (Streckeisen, 1976) using estimates of modal quartz, plagioclase, and K-feldspar from stained slabs and (or) thin sections. Preliminary Rb-Sr whole-rock isochron ages are from A.C. Robinson (written commun., 1988-1990) and are based mostly on samples reported in this paper. Interpretation and discussion of the chemical data, particularly apparent systematic compositional differences between different age groups of plutons, are presented in John, Stewart, and others (in press) and John, Schweickert, and Robinson (in press).

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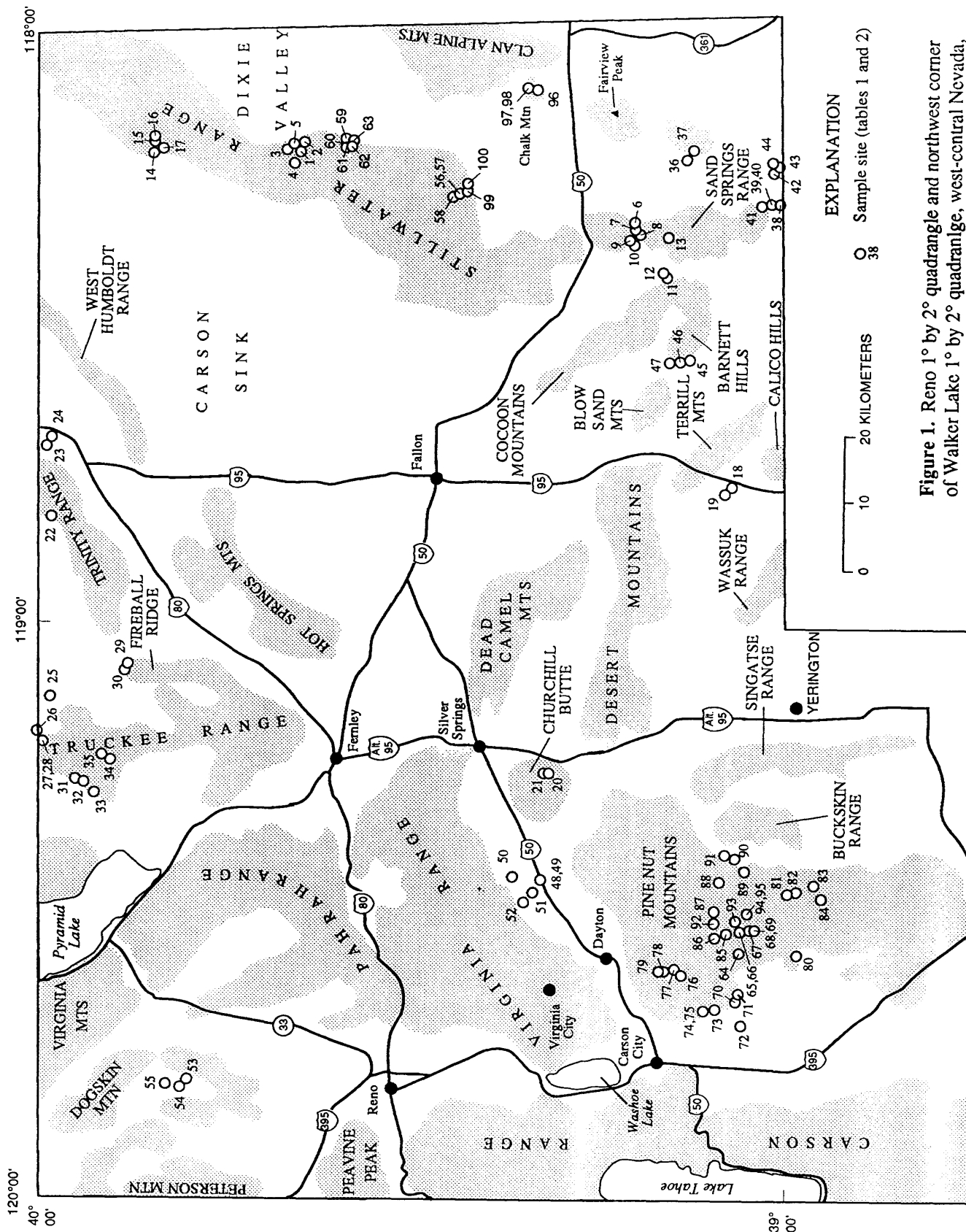


Figure 1. Reno 1° by 2° quadrangle and northwest corner of Walker Lake 1° by 2° quadrangle, west-central Nevada, showing locations of samples analyzed in this study

Table 1. Chemical analyses of granitic rocks in the Reno 1° by 2° quadrangle and in the northern Pine Nut Mountains, west-central Nevada

[FeO*, total Fe as FeO; A/CNK, $\text{Al}_2\text{O}_3/(\text{CaO}+\text{Na}_2\text{O}+\text{K}_2\text{O})$ in mole percent; $\text{Fe}^{+3}/\text{Fe}^{+2}$ in weight percent; LOI, loss on ignition at 900°C.]

	1	2	3	4	5	6	7	8
Sample number	86-DJ-61	86-DJ-62	86-DJ-64	86-DJ-88	86-DJ-95	87-DJ-56	87-DJ-57	87-DJ-59
Major oxides normalized to 100 percent volatile-free (weight percent)								
SiO ₂	66.29	63.10	68.56	67.23	65.76	71.57	69.84	69.61
Al ₂ O ₃	16.34	17.13	15.69	16.02	16.29	15.43	16.32	16.49
FeO	1.79	2.44	1.42	1.61	2.01	.71	1.02	1.01
Fe ₂ O ₃	2.02	2.25	1.68	1.84	2.17	1.26	1.21	1.10
MgO	1.32	1.94	1.02	1.22	1.63	.50	.65	.60
CaO	4.02	5.81	2.75	3.22	3.66	2.19	2.62	2.88
Na ₂ O	3.96	3.87	3.97	4.08	3.77	4.20	4.74	4.89
K ₂ O	3.49	2.57	4.24	4.02	3.81	3.76	3.15	2.97
TiO ₂	.43	.49	.45	.45	.55	.26	.30	.30
P ₂ O ₅	.26	.33	.18	.20	.26	.08	.11	.11
MnO	.08	.08	.05	.10	.10	.03	.04	.03
LOI	.41	.53	.61	.64	.87	.49	.58	.41
Total before normalization ¹	98.51	98.10	98.17	98.03	98.24	98.50	98.66	98.84
H ₂ O ⁺	.42	.55	.54	.47	.71	—	.57	—
H ₂ O ⁻	.10	.07	.08	.15	.20	—	.13	—
CO ₂	.04	.26	.03	.15	.09	<.01	.02	.08
F	—	—	—	—	—	.01	.02	.02
Minor elements (ppm)								
Ba	1,400	1,150	1,800	1,650	1,500	1,490	1,300	1,090
Ce	98	60	98	82	88	35	50	36
Cr	<20	<20	<20	<20	<20	<20	<20	<20
Cu	<20	<20	22	<20	<20	<2	7	6
La	78	58	102	80	78	9	30	13
Nb	10	<10	14	14	18	<10	<10	<10
Ni	<20	<20	<20	<20	<20	<5	<5	<5
Rb	100	68	126	118	120	109	115	90
Sr	680	840	600	600	620	605	758	704
Y	18	16	22	20	22	5	8	<2
Zn	52	54	58	68	62	60	84	68
Zr	205	152	228	196	210	79	88	88
K/Rb	290	314	279	283	263	286	228	274
Rb/Sr	.15	.08	.21	.20	.19	.18	.15	.13
Na ₂ O+K ₂ O	7.45	6.44	8.21	8.10	7.57	7.96	7.90	7.86
FeO*	3.60	4.46	2.93	3.27	3.96	1.85	2.11	2.00
Fe ⁺³ /Fe ⁺²	1.13	.92	1.18	1.14	1.08	1.78	1.18	1.09
A/CNK	.93	.87	.97	.95	.96	1.03	1.02	1.00

¹Volatile-free

Table 1. Chemical analyses of granitic rocks in the Reno 1° by 2° quadrangle and in the northern Pine Nut Mountains, west-central Nevada—Continued

[FeO*, total Fe as FeO; A/CNK, $\text{Al}_2\text{O}_3/(\text{CaO}+\text{Na}_2\text{O}+\text{K}_2\text{O})$ in mole percent; $\text{Fe}^{+3}/\text{Fe}^{+2}$ in weight percent; LOI, loss on ignition at 900°C.]

	9	10	11	12	13	14	15	16
Sample number	87-DJ-60	87-DJ-62	87-DJ-64	87-DJ-65	87-DJ-67	87-DJ-68	87-DJ-69	87-DJ-71
Major oxides normalized to 100 percent volatile-free (weight percent)								
SiO ₂	76.72	69.19	65.31	66.28	76.66	74.23	75.93	76.56
Al ₂ O ₃	13.06	16.14	17.14	17.00	13.08	13.69	12.76	12.36
FeO	.34	.90	1.71	1.60	.45	.83	.76	.81
Fe ₂ O ₃	.30	.93	2.19	1.85	.58	1.14	.94	.93
MgO	.11	.51	1.36	1.27	<.10	.35	.13	<.10
CaO	1.13	2.39	4.04	3.82	.67	.86	.66	.61
Na ₂ O	3.44	4.35	4.58	4.37	3.68	4.10	4.08	3.94
K ₂ O	4.90	5.18	2.83	3.09	4.84	4.65	4.68	4.73
TiO ₂	<.02	.29	.56	.49	.03	.14	.07	.06
P ₂ O ₅	<.05	.10	.22	.18	<.05	<.05	<.05	<.05
MnO	<.02	.02	.05	.05	<.02	<.02	<.02	<.02
LOI	.51	.45	.59	.60	.36	.64	.64	.74
Total before normalization ¹	98.80	97.27	98.60	98.83	99.40	98.61	98.61	98.78
H ₂ O ⁺	.26	.35	.56	.53	.25	.46	.46	.35
H ₂ O ⁻	.14	.08	.10	.09	.07	.09	.09	.10
CO ₂	.40	.04	<.01	.03	<.01	<.01	<.01	.20
F	<.01	.02	.02	.03	<.01	.04	.07	.17
Minor elements (ppm)								
Ba	195	3,210	1,340	1,420	73	532	79	14
Ce	9	48	55	49	24	60	49	78
Cr	<20	<20	<20	<20	<20	<20	<20	<20
Cu	7	11	6	7	7	<2	8	3
La	6	19	18	11	7	27	29	47
Nb	<10	<10	<10	<10	<10	29	31	43
Ni	<5	<5	<5	6	<5	<5	<5	<5
Rb	194	127	99	112	203	296	284	398
Sr	198	828	864	847	105	145	37	10
Y	5	5	6	5	6	34	47	60
Zn	26	60	84	76	28	46	52	50
Zr	28	76	95	87	38	162	156	193
K/Rb	210	339	237	229	198	131	137	99
Rb/Sr	.98	.15	.11	.13	1.93	2.04	7.68	39.80
Na ₂ O+K ₂ O	8.34	9.53	7.41	7.46	8.52	8.75	8.76	8.67
FeO*	.61	1.74	3.69	3.26	.98	1.85	1.60	1.65
Fe ⁺³ /Fe ⁺²	.86	1.03	1.28	1.16	1.29	1.37	1.24	1.15
A/CNK	1.00	.94	.96	.97	1.04	1.03	.98	.97

¹Volatile-free

Table 1. Chemical analyses of granitic rocks in the Reno 1° by 2° quadrangle and in the northern Pine Nut Mountains, west-central Nevada—Continued

[FeO*, total Fe as FeO; A/CNK, Al₂O₃/(CaO+Na₂O+K₂O) in mole percent; Fe⁺³/Fe⁺² in weight percent; LOI, loss on ignition at 900°C.]

	17	18	19	20	21	22	23	24
Sample number	87-DJ-76	87-DJ-95	87-DJ-97	87-DJ-99	87-DJ-100	87-DJ-120	87-DJ-124	87-DJ-126
Major oxides normalized to 100 percent volatile-free (weight percent)								
SiO ₂	76.97	67.65	64.98	67.24	64.89	56.85	69.93	70.10
Al ₂ O ₃	12.30	15.71	15.81	16.35	17.19	20.58	16.24	15.97
FeO	.97	1.59	1.90	1.91	2.34	4.29	1.40	1.75
Fe ₂ O ₃	.77	1.05	1.90	1.70	1.77	1.03	.67	.84
MgO	<.10	2.03	2.42	1.35	1.87	4.58	.67	.83
CaO	.44	3.79	4.36	3.39	4.29	2.88	3.01	2.96
Na ₂ O	4.20	5.33	4.67	3.76	4.44	4.61	4.39	4.22
K ₂ O	4.32	2.19	3.17	3.64	2.45	4.00	3.24	2.77
TiO ₂	.04	.41	.48	.45	.54	.85	.32	.41
P ₂ O ₅	<.05	.23	.29	.15	.16	.26	.12	.15
MnO	<.02	.02	.03	.06	.06	.05	<.02	<.02
LOI	.64	.64	.68	.46	1.30	2.81	.61	.76
Total before normalization ¹	98.74	98.36	98.01	98.04	97.86	96.22	98.53	98.29
H ₂ O ⁺	.34	.30	.40	.36	.89	3.11	.46	.68
H ₂ O ⁻	.12	.06	.13	.11	.21	.15	.12	.12
CO ₂	.09	<.01	.24	.17	.32	.04	.10	.09
F	.17	.05	.09	.02	.02	.04	.02	.02
Minor elements (ppm)								
Ba	8	2,720	2,980	1,550	1,060	934	1,020	952
Ce	78	32	34	19	44	38	37	52
Cr	<20	36	29	<20	<20	26	<20	<20
Cu	3	5	4	33	4	297	14	11
La	32	5	<2	3	14	17	5	18
Nb	60	<10	<10	<10	<10	<10	<10	<10
Ni	<5	26	40	<5	10	28	5	6
Rb	314	63	89	93	68	206	109	110
Sr	11	1600	1790	608	698	573	610	609
Y	77	<2	<2	10	6	18	7	5
Zn	35	21	25	603	68	84	67	90
Zr	183	79	77	68	67	153	88	100
K/Rb	114	289	296	325	299	161	247	209
Rb/Sr	28.55	.04	.05	.15	.10	.36	.18	.18
Na ₂ O+K ₂ O	8.52	7.52	7.84	7.40	6.90	8.62	7.63	6.99
FeO*	1.66	2.54	3.61	3.44	3.93	5.22	2.00	2.50
Fe ⁺³ /Fe ⁺²	.80	.66	1.00	.89	.76	.24	.48	.48
A/CNK	.99	.87	.83	1.00	.97	1.20	1.00	1.04

¹Volatile-free

Table 1. Chemical analyses of granitic rocks in the Reno 1° by 2° quadrangle and in the northern Pine Nut Mountains, west-central Nevada—Continued

[FeO*, total Fe as FeO; A/CNK, $\text{Al}_2\text{O}_3/(\text{CaO}+\text{Na}_2\text{O}+\text{K}_2\text{O})$ in mole percent; $\text{Fe}^{+3}/\text{Fe}^{+2}$ in weight percent; LOI, loss on ignition at 900°C.]

	25	26	27	28	29	30	31	32
Sample number	87-DJ-128	87-DJ-129	87-DJ-130	87-DJ-131	87-DJ-134	87-DJ-135	87-DJ-137	87-DJ-138
Major oxides normalized to 100 percent volatile-free (weight percent)								
SiO ₂	66.32	74.66	62.63	76.24	60.42	55.42	71.59	71.30
Al ₂ O ₃	16.53	13.86	17.13	12.93	16.93	21.43	15.21	15.72
FeO	2.17	.64	3.79	.61	2.91	2.54	1.14	1.17
Fe ₂ O ₃	1.85	.60	1.35	.15	3.42	2.88	1.01	.73
MgO	1.81	.41	2.72	.20	1.96	1.72	.78	.68
CaO	4.29	1.70	5.51	1.00	4.15	7.61	2.09	1.94
Na ₂ O	3.81	3.33	3.60	2.09	4.50	4.64	4.23	4.50
K ₂ O	2.57	4.67	2.44	6.75	3.96	2.39	3.56	3.61
TiO ₂	.43	.11	.58	.04	1.18	.96	.26	.23
P ₂ O ₅	.15	<.05	.17	<.05	.45	.34	.09	.09
MnO	.08	.02	.09	<.02	.13	.07	.04	.02
LOI	.49	.45	.65	.15	.75	2.23	.64	.61
Total before normalization ¹	98.61	98.85	98.68	99.02	98.64	97.08	98.62	98.59
H ₂ O ⁺	.65	.36	.93	.21	.94	1.42	.51	.61
H ₂ O ⁻	.10	.09	.07	.05	.14	.15	.06	.06
CO ₂	.01	.05	.02	<.01	<.01	<.01	.79	.14
F	.01	.01	.02	<.01	.03	.03	.02	.01
Minor elements (ppm)								
Ba	871	408	907	1,300	1,350	787	1,240	1,270
Ce	54	29	52	65	69	55	33	32
Cr	<20	<20	<20	<20	<20	<20	<20	<20
Cu	11	95	14	17	54	67	<2	5
La	29	15	20	39	29	21	15	5
Nb	10	14	<10	<10	13	<10	<10	12
Ni	7	<5	11	7	7	16	<5	<5
Rb	98	206	88	150	113	86	115	105
Sr	555	229	539	333	492	983	241	273
Y	14	10	17	6	41	20	16	16
Zn	69	41	72	22	95	64	24	29
Zr	88	65	106	76	329	179	88	89
K/Rb	217	188	230	373	291	231	257	285
Rb/Sr	.18	.90	.16	.45	.23	.09	.48	.38
Na ₂ O+K ₂ O	6.38	8.00	6.04	8.84	8.46	7.03	7.79	8.11
FeO*	3.84	1.18	5.00	.74	5.99	5.14	2.05	1.83
Fe ⁺³ /Fe ⁺²	.85	.94	.36	.24	1.18	1.13	.89	.63
A/CNK	.98	1.02	.92	1.03	.88	.89	1.04	1.06

¹Volatile-free

Table 1. Chemical analyses of granitic rocks in the Reno 1° by 2° quadrangle and in the northern Pine Nut Mountains, west-central Nevada—Continued

[FeO*, total Fe as FeO; A/CNK, $\text{Al}_2\text{O}_3/(\text{CaO}+\text{Na}_2\text{O}+\text{K}_2\text{O})$ in mole percent; $\text{Fe}^{+3}/\text{Fe}^{+2}$ in weight percent; LOI, loss on ignition at 900°C.]

	33	34	35	36	37	38	39	40
Sample number	87-DJ-141	87-DJ-142	87-DJ-143	87-DJ-146	87-DJ-147	87-DJ-148	87-DJ-149	87-DJ-150
Major oxides normalized to 100 percent volatile-free (weight percent)								
SiO ₂	71.54	64.66	63.04	72.70	73.62	67.70	65.07	83.65
Al ₂ O ₃	15.12	16.65	17.10	15.37	14.70	16.47	17.49	9.16
FeO	1.27	2.99	3.25	.52	.55	1.92	2.42	.37
Fe ₂ O ₃	.89	1.63	1.87	.74	1.12	1.45	1.76	.18
MgO	.68	2.30	2.66	.31	.40	1.16	1.47	<.10
CaO	2.07	4.68	5.27	1.73	1.76	3.79	4.45	.52
Na ₂ O	4.44	3.67	3.74	4.30	4.19	3.75	4.01	2.87
K ₂ O	3.60	2.68	2.24	4.08	3.38	3.21	2.61	3.22
TiO ₂	.24	.52	.58	.18	.22	.33	.41	.02
P ₂ O ₅	.09	.14	.16	.07	.07	.14	.20	<.05
MnO	.05	.07	.09	<.02	<.02	.09	.11	<.02
LOI	.72	.58	.70	.37	.50	1.02	.94	.27
Total before normalization ¹	98.54	98.52	98.83	98.89	98.62	98.38	98.36	98.98
H ₂ O ⁺	.37	.81	.88		.43	.69	.75	.14
H ₂ O ⁻	.16	<.05	.14		.09	.12	.18	.08
CO ₂	.32	.05	.02	<.01	<.01	.42	.31	.10
F	.01	.01	.01	.01	.02	<.01	.02	<.01
Minor elements (ppm)								
Ba	1,190	967	864	1,750	818	1,100	1,030	518
Ce	38	39	31	27	32	54	40	18
Cr	<20	<20	<20	<20	<20	<20	<20	<20
Cu	<2	9	28	4	6	10	44	2
La	12	19	15	11	21	23	10	3
Nb	<10	<10	<10	<10	<10	12	12	12
Ni	<5	10	14	<5	<5	<5	6	<5
Rb	111	78	69	136	131	133	114	131
Sr	215	504	544	624	545	561	656	50
Y	18	10	8	5	4	9	13	9
Zn	28	68	82	48	58	62	80	20
Zr	95	78	85	75	73	96	110	80
K/Rb	269	285	269	249	214	200	190	204
Rb/Sr	.52	.15	.13	.22	.24	.24	.17	2.62
Na ₂ O+K ₂ O	8.05	6.35	5.98	8.37	7.56	6.96	6.62	6.09
FeO*	2.07	4.46	4.93	1.18	1.55	3.22	4.00	.54
Fe ⁺³ /Fe ⁺²	.70	.54	.58	1.44	2.04	.75	.73	.48
A/CNK	1.01	.95	.94	1.05	1.07	1.00	1.00	1.00

¹Volatile-free

Table 1. Chemical analyses of granitic rocks in the Reno 1° by 2° quadrangle and in the northern Pine Nut Mountains, west-central Nevada—Continued

[FeO*, total Fe as FeO; A/CNK, $\text{Al}_2\text{O}_3/(\text{CaO}+\text{Na}_2\text{O}+\text{K}_2\text{O})$ in mole percent; $\text{Fe}^{+3}/\text{Fe}^{+2}$ in weight percent; LOI, loss on ignition at 900°C.]

	41	42	43	44	45	46	47	48
Sample number	87-DJ-153	87-DJ-157	87-DJ-158	87-DJ-159	87-DJ-164	87-DJ-165	87-DJ-167	87-DJ-170
Major oxides normalized to 100 percent volatile-free (weight percent)								
SiO ₂	69.92	70.51	68.92	62.96	74.29	75.01	67.01	63.28
Al ₂ O ₃	16.01	14.95	15.71	16.10	14.07	14.09	18.12	16.95
FeO	1.12	1.70	1.84	2.34	1.01	.53	1.18	2.78
Fe ₂ O ₃	1.33	1.20	1.22	2.72	.56	.74	1.49	3.03
MgO	.73	1.11	1.23	2.66	.43	.22	.81	2.43
CaO	2.54	2.57	3.02	4.33	1.41	1.20	3.11	3.54
Na ₂ O	4.06	3.37	3.62	4.21	4.16	3.80	5.60	3.07
K ₂ O	3.79	4.15	3.98	3.58	3.79	4.30	2.17	4.02
TiO ₂	.33	.31	.33	.64	.19	.11	.32	.63
P ₂ O ₅	.13	.09	.09	.40	.07	<.05	.14	.16
MnO	.03	.04	.04	.07	.03	<.02	.05	.10
LOI	.58	.42	.46	.91	.60	.56	.60	2.34
Total before normalization ¹	98.69	99.00	98.67	98.16	98.80	98.65	98.79	97.35
H ₂ O ⁺	.53	.48	.45	.82	.45	.44	.66	2.19
H ₂ O ⁻	.16	.09	.10	.18	.08	.08	<.05	.22
CO ₂	<.01	.03	.04	.10	.08	.06	.03	.06
F	.02	.01	.02	.05	.02	<.01	<.01	.03
Minor elements (ppm)								
Ba	1,430	1,080	1,110	1,980	1,530	1,460	1,090	799
Ce	38	37	38	59	49	37	29	32
Cr	48	60	<20	<20	<20	<20	<20	<20
Cu	13	37	107	<2	5	2	8	31
La	14	16	12	21	15	14	22	8
Nb	<10	14	<10	<10	<10	<10	<10	<10
Ni	7	<5	<5	25	7	<5	<5	7
Rb	98	176	158	123	97	135	48	136
Sr	647	381	436	1,300	233	223	531	371
Y	6	16	5	8	8	11	4	23
Zn	86	42	48	47	44	17	56	99
Zr	98	124	124	136	122	104	195	123
K/Rb	321	196	209	241	324	264	375	245
Rb/Sr	.15	.46	.36	.09	.42	.61	.09	.37
Na ₂ O+K ₂ O	7.85	7.53	7.60	7.78	7.95	8.10	7.76	7.09
FeO*	2.32	2.77	2.94	4.79	1.51	1.20	2.52	5.51
Fe ⁺³ /Fe ⁺²	1.18	.71	.66	1.16	.55	1.41	1.26	1.09
A/CNK	1.04	1.02	1.00	.86	1.04	1.08	1.05	1.07

¹Volatile-free

Table 1. Chemical analyses of granitic rocks in the Reno 1° by 2° quadrangle and in the northern Pine Nut Mountains, west-central Nevada—Continued

[FeO*, total Fe as FeO; A/CNK, $\text{Al}_2\text{O}_3/(\text{CaO}+\text{Na}_2\text{O}+\text{K}_2\text{O})$ in mole percent; $\text{Fe}^{+3}/\text{Fe}^{+2}$ in weight percent; LOI, loss on ignition at 900°C.]

	49	50	51	52	53	54	55	56
Sample number	87-DJ-171	87-DJ-173	87-DJ-174	87-DJ-175	87-DJ-184	87-DJ-185	87-DJ-186	88-DJ-72
Major oxides normalized to 100 percent volatile-free (weight percent)								
SiO ₂	61.20	72.47	61.22	64.51	67.10	66.53	64.60	67.84
Al ₂ O ₃	17.12	14.84	17.20	16.28	15.48	16.71	16.38	17.39
FeO	3.67	.74	3.50	2.95	2.20	2.03	2.70	.90
Fe ₂ O ₃	2.60	1.28	2.85	1.99	2.03	1.66	2.31	1.47
MgO	2.71	.48	2.65	1.95	1.71	1.58	2.03	.71
CaO	5.62	1.95	5.40	4.13	3.09	3.74	4.48	2.97
Na ₂ O	3.29	4.15	3.62	3.43	3.23	3.90	3.66	4.65
K ₂ O	2.78	3.70	2.57	3.90	4.33	3.19	2.92	3.24
TiO ₂	.74	.26	.70	.65	.48	.45	.61	.52
P ₂ O ₅	.16	.09	.17	.14	.27	.14	.24	.23
MnO	.11	.03	.11	.07	.09	.08	.07	.07
LOI	.67	.49	.56	.41	.60	.56	.42	.74
Total before normalization ¹	98.69	99.07	98.83	98.90	98.21	98.75	98.92	98.32
H ₂ O ⁺	1.08	.57	.99	.70	.77	.86	.72	.56
H ₂ O ⁻	.05	<.05	<.05	<.05	.10	<.05	.07	.26
CO ₂	.01	<.01	.01	.02	<.01	<.01	<.01	.03
F	.01	<.01	.02	.03	.01	.01	.02	—
Minor elements (ppm)								
Ba	974	955	704	968	1,530	1,110	981	1,800
Ce	46	39	45	53	28	54	39	82
Cr	24	<20	27	26	31	<20	48	<20
Cu	27	17	42	31	7	6	35	14
La	12	28	21	22	3	21	18	32
Nb	<10	<10	<10	14	<10	<10	<10	<10
Ni	10	<5	7	7	7	7	14	<10
Rb	89	148	92	151	106	90	94	76
Sr	494	474	386	392	401	495	426	820
Y	19	8	24	28	11	11	19	10
Zn	82	64	84	57	81	76	73	130
Zr	94	90	118	188	85	104	155	144
K/Rb	259	208	232	215	339	294	258	354
Rb/Sr	.18	.31	.24	.39	.26	.18	.22	.09
Na ₂ O+K ₂ O	6.07	7.85	6.19	7.33	7.56	7.09	6.58	7.89
FeO*	6.00	1.89	6.07	4.74	4.03	3.52	4.78	2.22
Fe ⁺³ /Fe ⁺²	.71	1.74	.81	.67	.92	.82	.86	1.65
A/CNK	.92	1.03	.93	.94	.99	1.00	.95	1.05

¹Volatile-free

Table 1. Chemical analyses of granitic rocks in the Reno 1° by 2° quadrangle and in the northern Pine Nut Mountains, west-central Nevada—Continued

[FeO*, total Fe as FeO; A/CNK, $\text{Al}_2\text{O}_3/(\text{CaO}+\text{Na}_2\text{O}+\text{K}_2\text{O})$ in mole percent; $\text{Fe}^{+3}/\text{Fe}^{+2}$ in weight percent; LOI, loss on ignition at 900°C.]

	57	58	59	60	61	62	63	64
Sample number	88-DJ-74	88-DJ-77	88-DJ-115	88-DJ-117	88-DJ-118	88-DJ-120	88-DJ-121	89-DJ-60
Major oxides normalized to 100 percent volatile-free (weight percent)								
SiO ₂	67.80	68.84	72.20	71.27	73.43	65.97	71.97	61.54
Al ₂ O ₃	17.23	17.13	14.89	15.05	14.34	17.16	14.41	16.68
FeO	1.35	1.08	.96	.81	.58	1.80	.81	2.49
Fe ₂ O ₃	1.07	.98	.68	1.20	.95	1.66	1.54	3.41
MgO	.72	.56	.25	.36	.25	.71	.51	2.74
CaO	3.09	2.82	1.09	1.44	1.03	2.70	1.64	5.18
Na ₂ O	4.59	4.63	4.56	4.58	4.14	4.70	4.06	3.65
K ₂ O	3.48	3.38	4.96	4.72	4.85	4.43	4.43	3.35
TiO ₂	.42	.36	.22	.31	.22	.51	.37	.69
P ₂ O ₅	.23	.20	.10	.18	.14	.27	.18	.20
MnO	.03	.02	.08	.09	.07	.09	.08	.07
LOI	1.32	.86	—	—	—	—	—	.74
Total before normalization ¹	97.49	98.06	98.75	98.36	99.01	97.92	98.52	98.31
H ₂ O ⁺	.59	.39	.06	.19	.13	.39	.11	.82
H ₂ O ⁻	.15	.31	—	—	.04	.08	.08	.14
CO ₂	.61	.11	—	—	—	—	—	.06
F	—	—	—	—	—	—	—	—
Minor elements (ppm)								
Ba	1,500	1,500	1,000	930	720	2,100	820	1,300
Ce	50	68	72	90	82	112	124	38
Cr	<20	<20						<20
Cu	24	<10						52
La	<30	<30	36	46	34	78	66	<30
Nb	<10	<10	20	24	20	26	26	<10
Ni	<10	<10						16
Rb	90	76	134	126	174	106	160	88
Sr	730	710	134	174	138	415	215	530
Y	14	<10	24	34	32	42	38	22
Zn	84	72	54	66	40	68	36	46
Zr	130	136	200	340	275	600	310	154
K/Rb	320	368	307	311	231	347	230	316
Rb/Sr	.12	.11	1.00	.72	1.26	.26	.74	.17
Na ₂ O+K ₂ O	8.06	8.01	9.52	9.30	8.99	9.13	8.49	7.00
FeO*	2.31	1.96	1.57	1.89	1.44	3.29	2.20	5.56
Fe ⁺³ /Fe ⁺²	.79	.91	.71	1.48	1.64	.92	1.90	1.37
A/CNK	1.02	1.04	1.00	.99	1.03	.98	1.00	.88

¹Volatile-free

Table 1. Chemical analyses of granitic rocks in the Reno 1° by 2° quadrangle and in the northern Pine Nut Mountains, west-central Nevada—Continued

[FeO*, total Fe as FeO; A/CNK, Al₂O₃/(CaO+Na₂O+K₂O) in mole percent; Fe⁺³/Fe⁺² in weight percent; LOI, loss on ignition at 900°C.]

	65	66	67	68	69	70	71	72
Sample number	89-DJ-61	89-DJ-62	89-DJ-63	89-DJ-64	89-DJ-67	89-DJ-69	89-DJ-70	89-DJ-72
Major oxides normalized to 100 percent volatile-free (weight percent)								
SiO ₂	66.94	64.31	67.25	59.34	65.58	56.07	61.30	57.37
Al ₂ O ₃	15.42	16.23	15.62	16.18	16.22	16.69	17.17	16.52
FeO	1.19	.96	.99	1.97	.23	3.37	2.53	3.89
Fe ₂ O ₃	2.17	5.25	2.24	3.73	4.73	2.80	3.34	3.14
MgO	1.53	1.31	1.30	3.73	1.78	3.54	2.52	3.99
CaO	3.65	1.17	3.40	6.16	2.37	7.93	5.14	6.17
Na ₂ O	4.03	4.81	4.12	4.81	4.71	4.01	3.92	4.32
K ₂ O	4.20	5.15	4.27	2.56	3.46	3.77	3.08	2.90
TiO ₂	.59	.59	.55	.97	.53	1.17	.67	1.09
P ₂ O ₅	.25	.22	.23	.47	.35	.58	.24	.48
MnO	.04	<.02	.03	.07	.05	.07	.08	.12
LOI	.54	.64	.51	.51	1.39	.67	.61	.35
Total before normalization ¹	98.60	98.59	98.59	98.25	98.05	98.27	99.01	98.66
H ₂ O ⁺	.45	.64	.38	.63	1.31	.70	.65	.92
H ₂ O ⁻	.19	.09	.20	.14	.15	.16	.20	.03
CO ₂	.08	<.01	.01	.02	.07	.14	.01	.04
F	—	—	—	—	—	—	—	—
Minor elements (ppm)								
Ba	1,500	2,200	1,500	1,400	2,100	1,700	1,400	1,500
Ce	64	<30	50	78	42	52	<30	62
Cr	<20	<20	<20	68	<20	<20	20	48
Cu	<10	<10	16	112	<10	<10	210	58
La	<30	<30	<30	<30	<30	<30	<30	<30
Nb	<10	<10	<10	<10	<10	<10	<10	<10
Ni	14	<10	10	46	12	24	10	34
Rb	98	78	100	42	72	64	90	56
Sr	940	530	910	1,500	880	1,400	610	1,200
Y	10	10	<10	<10	10	12	18	<10
Zn	44	22	42	56	44	40	36	88
Zr	148	106	132	130	120	124	162	122
K/Rb	356	548	354	507	399	488	284	430
Rb/Sr	.10	.15	.11	.03	.08	.05	.15	.05
Na ₂ O+K ₂ O	8.23	9.96	8.39	7.38	8.17	7.77	7.00	7.22
FeO*	3.14	5.69	3.01	5.33	4.49	5.89	5.54	6.72
Fe ⁺³ /Fe ⁺²	1.83	5.45	2.26	1.89	20.15	.83	1.32	.81
A/CNK	.87	1.04	.89	.74	1.03	.67	.90	.77

¹Volatile-free

Table 1. Chemical analyses of granitic rocks in the Reno 1° by 2° quadrangle and in the northern Pine Nut Mountains, west-central Nevada—Continued

[FeO*, total Fe as FeO; A/CNK, Al₂O₃/(CaO+Na₂O+K₂O) in mole percent; Fe⁺³/Fe⁺² in weight percent; LOI, loss on ignition at 900°C.]

	73	74	75	76	77	78	79	80
Sample number	89-DJ-73	89-DJ-74	89-DJ-75	89-DJ-76	89-DJ-77	89-DJ-78	89-DJ-79	89-DJ-84
Major oxides normalized to 100 percent volatile-free (weight percent)								
SiO ₂	67.19	68.70	55.99	62.07	66.74	67.26	67.86	69.70
Al ₂ O ₃	16.72	16.42	15.52	16.88	16.23	16.23	15.62	14.77
FeO	1.12	1.65	4.19	1.78	1.15	.85	1.19	1.00
Fe ₂ O ₃	2.07	.92	2.86	2.84	1.88	1.99	1.96	1.84
MgO	.92	.78	5.91	2.04	1.29	1.16	1.30	1.26
CaO	3.56	3.03	6.26	4.80	3.15	3.11	3.40	2.80
Na ₂ O	4.70	4.65	4.25	4.57	4.57	4.71	4.46	3.27
K ₂ O	2.99	3.23	3.33	3.86	4.19	3.95	3.44	4.81
TiO ₂	.48	.41	1.09	.79	.51	.50	.53	.36
P ₂ O ₅	.20	.16	.46	.31	.24	.22	.21	.15
MnO	.05	.04	.15	.05	.04	.03	.03	.03
LOI	.28	.35	.59	.55	.54	.65	.45	.64
Total before normalization ¹	99.28	99.27	98.59	98.92	98.59	98.58	98.58	98.85
H ₂ O ⁺	.44	.47	1.00	.54	.44	.41	.35	.46
H ₂ O ⁻	.07	.07	.07	.21	.10	.21	.17	.22
CO ₂	<.01	.07	.24	<.01	<.01	.07	<.01	.01
F	—	—	—	—	—	—	—	—
Minor elements (ppm)								
Ba	1,400	1,300	2,000	1,700	1,700	1,700	1,300	1,000
Ce	42	74	70	40	50	54	62	38
Cr	<20	<20	225	<20	<20	<20	<20	<20
Cu	10	<10	<10	26	10	10	<10	24
La	<30	<30	<30	<30	<30	<30	<30	<30
Nb	<10	<10	<10	<10	<10	<10	<10	<10
Ni	<10	<10	134	<10	<10	<10	<10	10
Rb	74	82	48	88	94	90	90	170
Sr	630	625	100	1,100	1,000	1,200	1,100	360
Y	<10	<10	12	14	<10	<10	<10	18
Zn	82	94	98	56	52	58	50	32
Zr	118	116	102	160	144	142	130	120
K/Rb	336	327	575	364	370	364	317	235
Rb/Sr	.12	.13	.48	.08	.09	.08	.08	.47
Na ₂ O+K ₂ O	7.70	7.89	7.58	8.43	8.76	8.65	7.90	8.07
FeO*	2.98	2.48	6.76	4.33	2.84	2.64	2.95	2.66
Fe ⁺³ /Fe ⁺²	1.85	.55	.68	1.59	1.64	2.33	1.65	1.84
A/CNK	.96	.99	.71	.83	.91	.92	.91	.94

¹Volatile-free

Table 1. Chemical analyses of granitic rocks in the Reno 1° by 2° quadrangle and in the northern Pine Nut Mountains, west-central Nevada—Continued

[FeO*, total Fe as FeO; A/CNK, $\text{Al}_2\text{O}_3/(\text{CaO}+\text{Na}_2\text{O}+\text{K}_2\text{O})$ in mole percent; $\text{Fe}^{+3}/\text{Fe}^{+2}$ in weight percent; LOI, loss on ignition at 900°C.]

	81	82	83	84	85	86	87	88
Sample number	89-DJ-85	89-DJ-88	89-DJ-91	89-DJ-92	89-DJ-93	89-DJ-94	89-DJ-95	89-DJ-96
Major oxides normalized to 100 percent volatile-free (weight percent)								
SiO ₂	59.71	61.78	64.12	65.94	65.26	65.31	68.10	67.96
Al ₂ O ₃	16.73	16.76	16.13	15.75	15.63	15.46	15.88	15.62
FeO	1.26	3.22	.94	1.23	1.66	.67	1.10	1.19
Fe ₂ O ₃	.94	2.16	.49	1.94	2.40	3.51	1.61	1.77
MgO	3.33	2.51	2.24	1.77	1.80	1.90	1.16	1.27
CaO	8.96	5.03	7.01	4.66	4.11	3.92	3.01	3.30
Na ₂ O	3.76	3.75	3.60	3.48	4.38	4.34	4.32	4.51
K ₂ O	4.17	3.73	4.48	4.39	3.69	3.72	4.14	3.57
TiO ₂	.82	.75	.72	.57	.64	.74	.44	.51
P ₂ O ₅	.29	.23	.22	.18	.37	.38	.20	.27
MnO	.04	.08	.03	.09	.05	.05	.03	.03
LOI	.86	.82	.75	.89	.55	.86	.66	.66
Total before normalization ¹	98.64	98.42	98.57	98.43	98.53	98.31	98.23	98.58
H ₂ O ⁺	.63	.89	.47	.58	.35	.50	.40	.41
H ₂ O ⁻	.16	.09	.15	.25	.11	.28	.19	.24
CO ₂	.03	.01	.04	.02	.04	.04	.05	.05
F	—	—	—	—	—	—	—	—
Minor elements (ppm)								
Ba	1,500	1,200	1,300	1,300	1,600	1,900	2,000	1,300
Ce	<30	38	48	70	72	78	42	72
Cr	22	<20	<20	<20	<20	<20	<20	<20
Cu	14	64	<10	<10	38	<10	78	335
La	<30	<30	<30	<30	<30	<30	<30	34
Nb	<10	<10	<10	<10	<10	<10	<10	<10
Ni	18	14	10	10	12	<10	12	10
Rb	104	120	124	130	100	94	112	94
Sr	740	520	640	520	1,000	970	1,100	970
Y	20	22	30	22	10	12	<10	12
Zn	28	54	34	40	62	52	36	26
Zr	120	158	245	185	285	235	146	225
K/Rb	333	258	300	280	307	329	307	315
Rb/Sr	.14	.23	.19	.25	.10	.10	.10	.10
Na ₂ O+K ₂ O	7.93	7.48	8.09	7.87	8.08	8.07	8.46	8.08
FeO*	2.10	5.16	1.39	2.97	3.83	3.83	2.55	2.78
Fe ⁺³ /Fe ⁺²	.74	.67	.52	1.58	1.44	5.22	1.46	1.49
A/CNK	.62	.87	.69	.83	.84	.85	.93	.90

¹Volatile-free

Table 1. Chemical analyses of granitic rocks in the Reno 1° by 2° quadrangle and in the northern Pine Nut Mountains, west-central Nevada—Continued

[FeO*, total Fe as FeO; A/CNK, $\text{Al}_2\text{O}_3/(\text{CaO}+\text{Na}_2\text{O}+\text{K}_2\text{O})$ in mole percent; $\text{Fe}^{+3}/\text{Fe}^{+2}$ in weight percent; LOI, loss on ignition at 900°C.]

	89	90	91	92	93	94	95	96
Sample number	89-DJ-97	89-DJ-100	89-DJ-101	89-DJ-102	89-DJ-103	89-DJ-104	89-DJ-105	CHM-26
Major oxides normalized to 100 percent volatile-free (weight percent)								
SiO ₂	60.55	63.68	59.88	66.95	67.93	64.98	64.66	69.51
Al ₂ O ₃	16.29	16.38	17.21	15.67	15.38	17.78	16.45	14.87
FeO	3.32	.12	3.00	1.35	.63	1.22	2.82	—
Fe ₂ O ₃	2.39	4.36	3.61	2.09	.49	2.28	1.75	3.07
MgO	3.86	2.21	3.02	1.48	1.51	1.53	1.59	1.19
CaO	6.16	2.86	5.92	3.43	4.42	2.50	3.15	2.89
Na ₂ O	3.83	6.43	3.91	4.35	4.11	5.01	4.73	3.75
K ₂ O	2.42	3.07	2.47	3.77	4.59	4.07	4.06	4.08
TiO ₂	.73	.54	.64	.57	.63	.46	.49	.42
P ₂ O ₅	.36	.25	.26	.30	.31	.18	.22	.16
MnO	.09	.09	.06	.04	<.02	<.02	.08	.05
LOI	3.86	.95	.91	.77	.97	1.25	1.09	.60
Total before normalization ¹	95.12	98.30	98.20	98.28	98.19	97.88	97.90	98.84
H ₂ O ⁺	1.91	.60	.88	.47	.40	.99	1.03	—
H ₂ O ⁻	.22	.08	.17	.38	.35	.16	.16	—
CO ₂	2.24	.16	.09	.04	.09	.17	.06	—
F	—	—	—	—	—	—	—	—
Minor elements (ppm)								
Ba	1,200	1,500	1,200	1,500	1,600	2,400	2,000	—
Ce	50	62	34	88	92	36	38	—
Cr	62	<20	<20	<20	<20	<20	<20	—
Cu	60	<10	120	180	132	34	220	—
La	<30	<30	<30	34	<30	<30	<30	—
Nb	<10	<10	<10	<10	<10	<10	<10	—
Ni	44	22	16	14	30	10	16	—
Rb	50	62	64	106	96	132	94	—
Sr	1,300	570	730	1,000	850	730	940	—
Y	<10	10	20	<10	14	<10	<10	—
Zn	94	66	36	42	30	24	78	—
Zr	146	120	110	210	260	118	120	—
K/Rb	401	411	321	296	397	256	358	—
Rb/Sr	.04	.11	.09	.11	.11	.18	.10	—
Na ₂ O+K ₂ O	6.24	9.50	6.39	8.13	8.71	9.07	8.78	7.83
FeO*	5.47	4.05	6.25	3.23	1.07	3.27	4.40	2.76
Fe ⁺³ /Fe ⁺²	.72	35.72	1.20	1.54	.78	1.87	.62	—
A/CNK	.81	.86	.87	.90	.78	1.03	.92	.94

¹Volatile-free

Table 1. Chemical analyses of granitic rocks in the Reno 1° by 2° quadrangle and in the northern Pine Nut Mountains, west-central Nevada—Continued

[FeO*, total Fe as FeO; A/CNK, $\text{Al}_2\text{O}_3/(\text{CaO}+\text{Na}_2\text{O}+\text{K}_2\text{O})$ in mole percent; $\text{Fe}^{+3}/\text{Fe}^{+2}$ in weight percent; LOI, loss on ignition at 900°C.]

	97	98	99	100
Sample number	CHM-33	CHM-34	LAP-08	LP-14A
Major oxides normalized to 100 percent volatile-free (weight percent)				
SiO ₂	72.58	73.16	76.32	70.54
Al ₂ O ₃	14.54	13.63	13.67	16.34
FeO	—	—	—	.96
Fe ₂ O ₃	.97	2.47	.53	.77
MgO	.50	.79	.14	.57
CaO	1.64	1.63	.90	2.51
Na ₂ O	3.36	3.57	3.93	4.46
K ₂ O	6.02	4.26	4.45	3.39
TiO ₂	.28	.32	.06	.30
P ₂ O ₅	.11	.11	<.05	.13
MnO	<.02	.05	<.02	.03
LOI	.76	.74	.58	.90
Total before normalization ¹	98.37	98.28	98.79	98.53
H ₂ O ⁺	—	—	—	.58
H ₂ O ⁻	—	—	—	.14
CO ₂	—	—	—	.17
F	—	—	—	—
Minor elements (ppm)				
Ba	—	—	—	—
Ce	—	—	—	—
Cr	—	—	—	—
Cu	—	—	—	—
La	—	—	—	—
Nb	—	—	—	—
Ni	—	—	—	—
Rb	—	—	—	—
Sr	—	—	—	—
Y	—	—	—	—
Zn	—	—	—	—
Zr	—	—	—	—
K/Rb	—	—	—	—
Rb/Sr	—	—	—	—
Na ₂ O+K ₂ O	9.38	7.83	8.38	7.85
FeO*	.87	2.23	.47	1.66
Fe ⁺³ /Fe ⁺²	—	—	—	.80
A/CNK	.97	1.01	1.06	1.05

¹Volatile-free

Table 2. Sample locations and descriptions

Sample number (table 1)—1

Field number—86-DJ-61

Location—southern Stillwater Range; lat 39°39'18"N., long 118°13'20"W.

Pluton name—IXL pluton

Sample description—Fine- to medium-grained, hypidomorphic granular, subporphyritic hornblende-biotite granodiorite. Contains small (3-5 mm) tabular plagioclase phenocrysts in finer grained groundmass. Color index is about 15-17. Hornblende locally has clinopyroxene cores.

Age—29-28 Ma (K-Ar; Speed and Armstrong, 1971; John and McKee, 1991).

Sample number (table 1)—2

Field number—86-DJ-62; lat 39°39'05"N., long 118°11'58"W.

Location—southern Stillwater Range

Pluton name—IXL pluton

Sample description—Medium-grained, hypidomorphic granular hornblende-biotite granodiorite. Color index is about 20 and mostly consists of biotite flakes.

Age—29-28 Ma (K-Ar; Speed and Armstrong, 1971; John and McKee, 1991)

Sample number (table 1)—3

Field number—86-DJ-64

Location—southern Stillwater Range; lat 39°40'02"N., long 118°12'40"W.

Pluton name—IXL pluton

Sample description—Fine- to medium-grained, hypidomorphic granular, biotite-hornblende granodiorite porphyry. Contains 1-5 mm plagioclase, pink K-feldspar, and hornblende phenocrysts in fine-grained aplitic groundmass. Color index is about 15.

Age—29-28 Ma (K-Ar; Speed and Armstrong, 1971; John and McKee, 1991)

Sample number (table 1)—4

Field number—86-DJ-88

Location—southern Stillwater Range; lat 39°39'10"N., long 118°14'13"W.

Pluton name—IXL pluton

Sample description—Fine- to medium-grained, sparsely porphyritic hornblende-biotite granodiorite. Color index is about 15. Contains small (5-7 mm) pink K-feldspar and white plagioclase phenocrysts.

Age—29-28 Ma (K-Ar; Speed and Armstrong, 1971; John and McKee, 1991)

Sample number (table 1)—5

Field number—86-DJ-95

Location—southern Stillwater Range; lat 39°39'20"N., 118°12'23"W.

Pluton name—IXL pluton

Sample description—Fine- to medium-grained, hypidomorphic granular biotite-hornblende granodiorite porphyry containing small amount of fine-grained granitic groundmass. Color index is about 15-17.

Age—29-28 Ma (K-Ar; Speed and Armstrong, 1971; John and McKee, 1991)

Sample number (table 1)—6

Field number—87-DJ-56

Location—Sand Springs Range; lat 39°12'01"N., long 118°20'28"W.

Pluton name—granite phase, Sand Springs pluton

Sample description—Medium- to coarse-grained biotite granite containing 0-5 percent white K-feldspar megacrysts as long as 4 cm. Color index is about 8-10. Contains prominent ovoid quartz crystals as much as 7 mm in diameter.

Age—81-78.5 Ma (K-Ar; Willden and Speed, 1974), 81-82 Ma (Rb-Sr)

Table 2. Sample locations and descriptions—Continued

Sample number (table 1)—7

Field number—87-DJ-57

Location—Sand Springs Range; lat 39°11'59"N., long 118°20'47"W.

Pluton name—granite phase, Sand Springs pluton

Sample description—Medium- to coarse-grained, coarsely porphyritic biotite granite. Color index is about 5-7.

Contains 0-5 percent, pink-colored K-feldspar megacrysts as long as 4 cm and abundant ovoid quartz crystals as much as 7 mm in diameter.

Age—81-78.5 Ma (K-Ar; Willden and Speed, 1974), 81-82 Ma (Rb-Sr)

Sample number (table 1)—8

Field number—87-DJ-59

Location—Sand Springs Range; lat 39°11'42"N., long 118°21'59"W.

Pluton name—granite phase, Sand Springs pluton

Sample description—Medium- to coarse-grained, coarsely porphyritic biotite granite. Color index is about 5-7.

Contains 0-5 percent, pink-colored K-feldspar megacrysts as long as 4 cm and abundant ovoid quartz crystals as much as 7 mm in diameter.

Age—81-78.5 Ma (K-Ar; Willden and Speed, 1974), 81-82 Ma (Rb-Sr)

Sample number (table 1)—9

Field number—87-DJ-60

Location—Sand Springs Range; lat 39°12'21"N., long 118°22'46"W.

Pluton name—Sand Springs pluton

Sample description—aplite

Age—81-78.5 Ma (K-Ar; Willden and Speed, 1974), 81-82 Ma (Rb-Sr)

Sample number (table 1)—10

Field number—87-DJ-62

Location—Sand Springs Range; lat 39°12'00"N., long 118°22'54"W.

Pluton name—granite phase, Sand Springs pluton

Sample description—Medium- to coarse-grained, coarsely porphyritic biotite granite. Contains about 5-7 percent partly chloritized biotite, 0-5 percent, pale pink K-feldspar megacrysts as long as 4 cm, and abundant ovoid quartz crystals as much as 7 mm in diameter.

Age—81-78.5 Ma (K-Ar; Willden and Speed, 1974), 81-82 Ma (Rb-Sr)

Sample number (table 1)—11

Field number—87-DJ-64

Location—Sand Springs Range; lat 39°09'59"N., long 118°26'27"W.

Pluton name—granodiorite phase, Sand Springs pluton

Sample description—Medium-grained, subporphyritic, foliated hornblende-biotite granodiorite. Contains small amount of aplitic groundmass. Color index is about 15-17. Parallel alignment of mafic minerals and strongly flattened mafic inclusions define strong foliation.

Age—81-78.5 Ma (K-Ar; Willden and Speed, 1974), 81-82 Ma (Rb-Sr)

Sample number (table 1)—12

Field number—87-DJ-65

Location—Sand Springs Range; lat 39°10'14"N., long 118°26'27"W.

Pluton name—granodiorite phase, Sand Springs pluton

Sample description—Medium-grained, subporphyritic, foliated hornblende-biotite granodiorite. Contains small amount of aplitic groundmass. Color index is about 15-17. Parallel alignment of mafic minerals and strongly flattened mafic inclusions define strong foliation.

Age—81-78.5 Ma (K-Ar; Willden and Speed, 1974), 81-82 Ma (Rb-Sr)

Table 2. Sample locations and descriptions—Continued

Sample number (table 1)—13

Field number—87-DJ-67

Location—Sand Springs Range; lat 39°09'28"N., long 118°22'47"W.

Pluton name—Sand Springs pluton

Sample description—aplite

Age—81-78.5 Ma (K-Ar; Willden and Speed, 1974), 81-82 Ma (Rb-Sr)

Sample number (table 1)—14

Field number—87-DJ-68

Location—White Cloud Canyon, Stillwater Range; lat 39°50'55"N., long 118°13'10"W.

Pluton name—White Cloud Canyon pluton

Sample description—Porphyritic biotite granite. Contains about 20 percent pink K-feldspar phenocrysts as long as 8 mm with thin white sodic(?) rims in fine-grained aplitic groundmass. Contains about 5 percent fine-grained biotite in the groundmass

Age—approx 30 Ma (Rb-Sr)

Sample number (table 1)—15

Field number—87-DJ-69

Location—White Cloud Canyon, Stillwater Range; lat 39°50'53"N., long 118°12'27"W.

Pluton name—White Cloud Canyon pluton

Sample description—Medium-grained leucocratic granite porphyry. Phenocrysts consist of 3-5 mm perthitic K-feldspar, rounded to bipyramidal quartz, and sparse plagioclase in a fine-grained (0.4 mm) granitic groundmass. Contains about 3 percent chloritized biotite.

Age—approx 30 Ma (Rb-Sr)

Sample number (table 1)—16

Field number—87-DJ-71

Location—White Cloud Canyon, Stillwater Range; lat 39°50'45"N., long 118°12'05"W.

Pluton name—White Cloud Canyon pluton

Sample description—Fine- to medium-grained graphic granite porphyry. Contains scattered, small (1-3 mm) K-feldspar, plagioclase, rounded quartz, and biotite phenocrysts in groundmass of graphic K-feldspar + quartz. Color index is about 3.

Age—approx 30 Ma (Rb-Sr)

Sample number (table 1)—17

Field number—87-DJ-76

Location—White Cloud Canyon, Stillwater Range; lat 39°50'45"N., long 118°12'30"W.

Pluton name—White Cloud Canyon pluton

Sample description—Granite porphyry containing 4-5 mm long white K-feldspar phenocrysts in fine-grained aplitic groundmass. Contains about 3-5 percent biotite.

Age—approx 30 Ma (Rb-Sr)

Sample number (table 1)—18

Field number—87-DJ-95

Location—near Weber Reservoir; lat 39°04'42"N., long 118°47'37"W.

Pluton name—Afterthought pluton

Sample description—Fine-grained, biotite-hornblende granodiorite. Color index is about 15-17 and consists mostly of subhedral hornblende. Weak foliation defined by parallel alignment of hornblende. Contains about 5 percent, 1-3 mm long, pink-colored K-feldspar phenocrysts.

Age—Jurassic(?)

Table 2. Sample locations and descriptions—Continued

Sample number (table 1)—19

Field number—87-DJ-97

Location—near Weber Reservoir; lat 39°04'53"N., long 118°48'07"W.

Pluton name—Afterthought pluton

Sample description—Fine- to medium-grained hornblende granodiorite. Color index is about 15-17 and consists mostly of subhedral hornblende. Pinkish K-feldspar phenocrysts are notably coarser grained (1-3 mm) than other minerals.

Age—Jurassic(?)

Sample number (table 1)—20

Field number—87-DJ-99

Location—Churchill Butte; lat 39°19'05"N., long 119°16'33"W.

Pluton name—Churchill Butte pluton

Sample description—Medium-grained, hypidomorphic granular hornblende-biotite granodiorite. Color index is about 12-15. Biotite moderately chloritized.

Age—Cretaceous(?)

Sample number (table 1)—21

Field number—87-DJ-100

Location—Churchill Butte; lat 39°19'43"N., long 119°16'53"W.

Pluton name—Churchill Butte pluton

Sample description—Medium-grained, subporphyritic hornblende-biotite granodiorite. Color index is about 15. Sparse acicular hornblende phenocrysts as long as 1 cm. Moderate propylitic alteration with biotite altered to chlorite and plagioclase replaced by sericite + epidote.

Age—Cretaceous(?)

Sample number (table 1)—22

Field number—87-DJ-120

Location—Copper Queen mine, Copper Valley; lat 39°59'07"N., long 118°50'22"W.

Pluton name—unnamed

Sample description—Strongly altered, fine- to medium-grained biotite quartz monzonite. Color index is about 25 and consists of chlorite + sphene replacing biotite + hornblende(?). Plagioclase crystals are bleached and partially replaced by sericite, epidote, and albite(?). Patches of chlorite + epidote + sphene are common. Outcrop cut by narrow tourmaline + quartz veins.

Age—Jurassic(?)

Sample number (table 1)—23

Field number—87-DJ-124

Location—St. Anthony mine; lat 39°59'25"N., long 118°42'41"W.

Pluton name—St. Anthony pluton

Sample description—Medium-grained, sparsely porphyritic biotite granodiorite. Color index is about 7. Contains scattered, small (≤ 1 cm), tabular K-feldspar phenocrysts.

Age—approx. 87 Ma (Rb-Sr)

Sample number (table 1)—24

Field number—87-DJ-126

Location—near St. Anthony mine; lat 39°59'20"N., long 118°42'33"W.

Pluton name—St. Anthony pluton

Sample description—Medium-grained, sparsely porphyritic biotite granodiorite. Color index is about 7. Contains scattered, small (≤ 1 cm), tabular K-feldspar phenocrysts.

Age—approx. 87 Ma (Rb-Sr)

Table 2. Sample locations and descriptions—Continued

Sample number (table 1)—25

Field number—87-DJ-128

Location—Trinity Range; lat 39°59'04"N., long 119°08'20"W.

Pluton name—unnamed

Sample description—Fine- to medium-grained, hypidomorphic granular hornblende-biotite granodiorite containing about 15-17 percent mafic minerals.

Age—Cretaceous(?)

Sample number (table 1)—26

Field number—87-DJ-129

Location—Trinity Range; lat 40°00'10"N., long 119°13'30"W.

Pluton name—unnamed

Sample description—Fine- to medium-grained biotite granite porphyry. Contains 2-5 mm phenocrysts of K-feldspar, plagioclase, quartz, and biotite in fine-grained to aplitic groundmass of quartz and K-feldspar. Color index is about 5.

Age—Cretaceous(?)

Sample number (table 1)—27

Field number—87-DJ-130

Location—Jay Bird mine; lat 39°59'53"N., long 119°13'37"W.

Pluton name—Jay Bird pluton

Sample description—Fine- to medium-grained, strongly foliated hornblende-biotite granodiorite or tonalite. Color index is about 25. Foliation defined by parallel alignment of biotite and hornblende. Poikilitic hornblende crystals locally contain clinopyroxene cores.

Age—approx. 126 Ma (Rb-Sr)

Sample number (table 1)—28

Field number—87-DJ-131

Location—Jay Bird mine; lat 39°59'48"N., long 119°13'30"W.

Pluton name—Jay Bird pluton

Sample description—Medium-grained, equigranular, foliated biotite-hornblende granodiorite or tonalite. Color index is about 30. Parallel alignment of mafic minerals defines strong foliation. Quartz, feldspar, and biotite commonly have undulose extinction.

Age—approx. 126 Ma (Rb-Sr)

Sample number (table 1)—29

Field number—87-DJ-134

Location—Fireball Ridge; lat 39°53'22"N., long 119°05'43"W.

Pluton name—unnamed

Sample description—Fine-grained, aplitic, sparsely porphyritic hornblende-biotite granodiorite containing small (1-3 mm) lath-like plagioclase phenocrysts. Color index is about 12-15.

Age—Jurassic(?)

Sample number (table 1)—30

Field number—87-DJ-135

Location—Fireball Ridge; lat 39°53'22"N., long 119°06'05"W.

Pluton name—unnamed

Sample description—Medium-grained hornblende monzodiorite. Intergranular texture with interstices between euhedral plagioclase crystals filled with pink K-feldspar, hornblende, and epidote. Color index is about 15.

Age—Jurassic(?)

Table 2. Sample locations and descriptions—Continued

Sample number (table 1)—31

Field number—87-DJ-137

Location—Coyote Canyon, Truckee Range; lat 39°57'18"N., long 119°17'01"W.

Pluton name—Coyote Canyon pluton

Sample description—Medium- to coarse-grained, sparsely porphyritic biotite granite. Contains abundant ovoid quartz as much as 8 mm in diameter, sparse K-feldspar phenocrysts as long as 1 cm, and about 7-10 percent biotite.

Age—approx. 112 Ma (Rb-Sr)

Sample number (table 1)—32

Field number—87-DJ-138

Location—Coyote Canyon, Truckee Range; lat 39°56'22"N., long 119°17'22"W.

Pluton name—Coyote Canyon pluton

Sample description—Medium- to coarse-grained, sparsely porphyritic biotite granite. Contains abundant ovoid quartz as much as 8 mm in diameter, sparse K-feldspar phenocrysts as long as 1 cm, and about 7-10 percent biotite. Locally contains sparse 5 mm pyrite cubes associated with coarse-grained sericitic alteration.

Age—approx. 112 Ma (Rb-Sr)

Sample number (table 1)—33

Field number—87-DJ-141

Location—Crosby mine, Truckee Range; lat 39°55'44"N., long 119°18'49"W.

Pluton name—Coyote Canyon pluton

Sample description—Medium- to coarse-grained, sparsely porphyritic biotite granite. Contains abundant ovoid quartz as much as 8 mm in diameter, sparse K-feldspar phenocrysts as long as 1 cm, and about 7-10 percent biotite.

Age—approx. 112 Ma (Rb-Sr)

Sample number (table 1)—34

Field number—87-DJ-142

Location—Black Warrior Peak; lat 39°54'15"N., long 119°15'10"W.

Pluton name—unnamed

Sample description—Medium-grained, sparsely porphyritic hypidomorphic granular biotite-hornblende granodiorite or tonalite. Color index is about 20. Contains sparse phenocrysts of acicular hornblende as long as 2 cm and oikocrystic K-feldspar as long as 1.5 cm.

Age—Cretaceous(?)

Sample number (table 1)—35

Field number—87-DJ-143

Location—Black Warrior Peak; lat 39°54'21"N., long 119°15'00"W.

Pluton name—unnamed

Sample description—Medium-grained, sparsely porphyritic hypidomorphic granular biotite-hornblende granodiorite or tonalite. Color index is about 20. Contains sparse phenocrysts of acicular hornblende as long as 2 cm and oikocrystic K-feldspar as long as 1.5 cm.

Age—Cretaceous(?)

Sample number (table 1)—36

Field number—87-DJ-146

Location—Slate Mountain; lat 39°07'37"N., long 118°14'25"W.

Pluton name—Slate Mountain pluton

Sample description—Medium- to coarse-grained, coarsely porphyritic biotite granite with K-feldspar megacrysts as long as 6 cm and abundant ovoid quartz as much as 1.5 cm in diameter. Contains about 7 percent anhedral biotite.

Age—82-81 Ma (Rb-Sr)

Table 2. Sample locations and descriptions—Continued

Sample number (table 1)—37

Field number—87-DJ-147

Location—Slate Mountain; lat 39°06'56"N., long 118°13'45"W.

Pluton name—Slate Mountain pluton

Sample description—Fine- to coarse-grained, coarsely porphyritic biotite granite with sparse K-feldspar megacrysts as long as 2 cm and abundant ovoid quartz as much as 1 cm in diameter. Contains about 7 percent anhedral biotite.

Age—82-81 Ma (Rb-Sr)

Sample number (table 1)—38

Field number—87-DJ-148

Location—Nevada Scheelite mine; lat 39°01'00"N., long 118°18'50"W.

Pluton name—Scheelite pluton

Sample description—Fine-grained, sparsely porphyritic hornblende-biotite granodiorite. Contains sparse 3 mm plagioclase and biotite phenocrysts. Color index is about 15.

Age—approx. 98 Ma (Rb-Sr)

Sample number (table 1)—39

Field number—87-DJ-149

Location—Nevada Scheelite mine; lat 39°01'06"N., long 118°18'54"W.

Pluton name—Scheelite pluton

Sample description—Fine-grained biotite granodiorite. Color index is about 15-17. Contains sparse 3-5 mm biotite phenocrysts and fine-grained biotite pseudomorphing acicular hornblende phenocrysts.

Age—approx. 98 Ma (Rb-Sr)

Sample number (table 1)—40

Field number—87-DJ-150

Location—Nevada Scheelite mine; lat 39°01'11"N., long 118°18'55"W.

Pluton name—Scheelite pluton

Sample description—aplite

Age—approx. 98 Ma (Rb-Sr)

Sample number (table 1)—41

Field number—87-DJ-153

Location—southern Sand Springs Range; lat 39°01'54"N., long 118°19'54"W.

Pluton name—unnamed

Sample description—Fine- to medium-grained subporphyritic biotite granite. Contains 1-4 mm phenocrysts of plagioclase, K-feldspar, biotite, and rounded quartz in aplitic groundmass. Color index is about 10-12.

Age—Cretaceous(?)

Sample number (table 1)—42

Field number—87-DJ-157

Location—south of Eagleville mine; lat 39°00'22"N., long 118°15'26"W.

Pluton name—unnamed

Sample description—Fine- to medium-grained, hypidomorphic granular hornblende-biotite tonalite. Color index is about 15-17.

Age—Cretaceous(?)

Sample number (table 1)—43

Field number—87-DJ-158

Location—south of Eagleville mine; lat 39°00'11"N., long 118°15'19"W.

Pluton name—unnamed

Sample description—Fine- to medium-grained, hypidomorphic granular hornblende-biotite tonalite. Color index is about 15-17.

Age—Cretaceous(?)

Table 2. Sample locations and descriptions—Continued

Sample number (table 1)—44

Field number—87-DJ-159

Location—south of Eagleville mine; lat 39°00'45"N., long 118°14'55"W.

Pluton name—unnamed

Sample description—Fine-grained, hypidomorphic granular biotite-hornblende monzodiorite. Contains about 30 percent mafic minerals consisting of partially biotitized hornblende and partially chloritized biotite. Local epidote alteration.

Age—Cretaceous(?)

Sample number (table 1)—45

Field number—87-DJ-164

Location—Barnett Hills; lat 39°08'10"N., long 118°35'04"W.

Pluton name—unnamed

Sample description—Medium- to coarse-grained hypidomorphic granular biotite granite. Contains about 5 percent anhedral biotite. Quartz and feldspars commonly show undulose extinction.

Age—Cretaceous(?)

Sample number (table 1)—46

Field number—87-DJ-165

Location—Barnett Hills; lat 39°08'19"N., long 118°35'05"W.

Pluton name—unnamed

Sample description—Fine- to medium-grained biotite granite. Contains sparse, small (5-7 mm) plagioclase and K-feldspar phenocrysts and about 3-5 percent biotite.

Age—Cretaceous(?)

Sample number (table 1)—47

Field number—87-DJ-167

Location—Barnett Hills; lat 39°08'53"N., long 118°35'13"W.

Pluton name—unnamed

Sample description—Medium-grained hornblende-biotite granodiorite containing about 15-17 percent subhedral mafic minerals. Mafic inclusions are abundant.

Age—Cretaceous(?)

Sample number (table 1)—48

Field number—87-DJ-170

Location—near Dayton iron deposit; lat 39°19'48"N., long 119°27'47"W.

Pluton name—unnamed

Sample description—Fine- to medium-grained, subporphyritic hornblende(?) -biotite tonalite containing 1-6 mm phenocrysts in an aplitic (0.1-0.2 mm) groundmass. Color index is about 25-30. Strongly propylitized with biotite + hornblende(?) completely replaced by chlorite + opaque minerals + sphene ± calcite ± epidote

Age—Cretaceous(?)

Sample number (table 1)—49

Field number—87-DJ-171

Location—near Dayton iron deposit; lat 39°19'41"N., long 119°27'45"W.

Pluton name—unnamed

Sample description—Medium-grained hypidomorphic granular biotite-hornblende tonalite. Color index is about 20-25 and consists of subhedral biotite and hornblende crystals as much as 4 mm across.

Age—Cretaceous(?)

Table 2. Sample locations and descriptions—Continued

Sample number (table 1)—50

Field number—87-DJ-173

Location—near Dayton iron deposit; lat 39°21'54"N., long 119°27'07"W.

Pluton name—unnamed

Sample description—Medium- to coarse-grained biotite granodiorite. Contains small (<1 cm) K-feldspar phenocrysts and ovoid quartz crystals as much as 1 cm in diameter. Contains about 10-12 percent biotite.

Age—Cretaceous(?)

Sample number (table 1)—51

Field number—87-DJ-174

Location—near Dayton iron deposit; lat 39°20'05"N., long 119°29'40"W.

Pluton name—unnamed

Sample description—Medium-grained, hypidomorphic granular biotite-hornblende tonalite. Color index is about 30.

Foliation defined by flattened mafic inclusions.

Age—Cretaceous(?)

Sample number (table 1)—52

Field number—87-DJ-175

Location—Iron Blossom prospect; lat 39°20'59"N., long 119°29'48"W.

Pluton name—Iron Blossom pluton

Sample description—Medium-grained, hypidomorphic granular biotite-hornblende granodiorite. Color index is about 15.

Age—Jurassic(?)

Sample number (table 1)—53

Field number—87-DJ-184

Location—Bedell Flat; 39°48'16"N., long 119°48'22"W.

Pluton name—unnamed

Sample description—Medium-grained, porphyritic hornblende-biotite granodiorite. Contains scattered K-feldspar oikocrysts as much as 1.5 cm long and poikilitic hornblende phenocrysts as much as 1 cm across. Color index is about 12-15. Sparse fine-grained sphene.

Age—Cretaceous(?)

Sample number (table 1)—54

Field number—87-DJ-185

Location—Bedell Flat; 39°48'27"N., long 119°48'42"W.

Pluton name—unnamed

Sample description—Medium-grained, porphyritic hornblende-biotite granodiorite. Contains sparse K-feldspar oikocrysts as much as 1.5 cm long and poikilitic hornblende phenocrysts as much as 1 cm across. Color index is about 12-15. Sparse fine-grained sphene.

Age—Cretaceous(?)

Sample number (table 1)—55

Field number—87-DJ-186

Location—Bedell Flat; 39°49'49"N., long 119°48'34"W.

Pluton name—unnamed

Sample description—Medium-grained, hypidomorphic granular biotite-hornblende granodiorite. Color index is about 15-17 consisting of subhedral hornblende and anhedral biotite. Potassium feldspar mostly forms scattered oikocrysts as much as 2 cm long.

Age—Cretaceous(?)

Table 2. Sample locations and descriptions—Continued

Sample number (table 1)—56

Field number—88-DJ-72

Location—La Plata Canyon, southern Stillwater Range; lat 39°25'44"N., long 118°18'10"W.

Pluton name—La Plata Canyon pluton

Sample description—Medium-grained, foliated biotite granodiorite containing about 15-17 percent anhedral to subhedral biotite.

Age—approx. 84 Ma (K-Ar; John and Silberling, in press)

Sample number (table 1)—57

Field number—88-DJ-74

Location—La Plata Canyon, southern Stillwater Range; lat 39°25'47"N., long 118°17'58"W.

Pluton name—La Plata Canyon pluton

Sample description—Fine- to medium-grained, weakly foliated biotite granodiorite. Contains 7-10 percent fine-grained anhedral biotite that is partially chloritized.

Age—approx. 84 Ma (K-Ar; John and Silberling, in press)

Sample number (table 1)—58

Field number—88-DJ-77

Location—La Plata Canyon, southern Stillwater Range; lat 39°26'23"N., long 118°18'14"W.

Pluton name—La Plata Canyon pluton

Sample description—Medium-grained, hypidomorphic granular biotite granodiorite. Color index is about 12-15.

Age—approx. 84 Ma (K-Ar; John and Silberling, in press)

Sample number (table 1)—59

Field number—88-DJ-115

Location—Freeman Creek, southern Stillwater Range; lat 39°35'24"N., long 118°11'20"W.

Pluton name—Freeman Creek pluton

Sample description—Medium- to coarse grained hornblende-biotite granite. Color index is 5-7 consisting of 5 mm clots of fine-grained biotite flakes and hornblende crystals as long as 5 mm that are locally replaced by fine-grained biotite. Plagioclase forms prominent blue-gray crystals with white rims. Tabular white K-feldspar as much as 7 mm long are abundant.

Age—approx. 24 Ma (K-Ar; D.A. John and E.H. McKee, unpub. data, 1991)

Sample number (table 1)—60

Field number—88-DJ-117

Location—Freeman Creek, southern Stillwater Range; lat 39°35'18"N., long 118°11'25"W.

Pluton name—Freeman Creek pluton

Sample description—Medium- to coarse-grained hornblende-biotite granite containing tabular K-feldspar phenocrysts as long as 1 cm.

Age—approx. 24 Ma (K-Ar; D.A. John and E.H. McKee, unpub. data, 1991)

Sample number (table 1)—61

Field number—88-DJ-118

Location—Freeman Creek, southern Stillwater Range; lat 39°35'20"N., long 118°11'35"W.

Pluton name—Freeman Creek pluton

Sample description—Medium- to coarse-grained hornblende-biotite granite. Color index is about 7. Hornblende crystals are mostly replaced by fine-grained biotite.

Age—approx. 24 Ma (K-Ar; D.A. John and E.H. McKee, unpub. data, 1991)

Table 2. Sample locations and descriptions—Continued

Sample number (table 1)—62

Field number—88-DJ-120

Location—Freeman Creek, southern Stillwater Range; lat 39°35'11"N., long 118°12'28"W.

Pluton name—Freeman Creek pluton

Sample description—Fine- to medium-grained hornblende-biotite granodiorite. Contains small amount of fine-grained groundmass. Color index is about 12-15. Contains sparse K-feldspar phenocrysts as much as 1 cm long.

Age—approx. 24 Ma (K-Ar; D.A. John and E.H. McKee, unpub. data, 1991)

Sample number (table 1)—63

Field number—88-DJ-121

Location—Freeman Creek, southern Stillwater Range; lat 39°35'03"N., long 118°11'41"W.

Pluton name—Freeman Creek pluton

Sample description—Fine- to medium-grained hornblende-biotite granite porphyry. Contains 3-5 mm phenocrysts of pink K-feldspar, gray plagioclase, quartz, hornblende and biotite in sparse aplitic groundmass. Color index is about 10-12. Hornblende is mostly replaced by fine-grained biotite.

Age—approx. 24 Ma (K-Ar; D.A. John and E.H. McKee, unpub. data, 1991)

Sample number (table 1)—64

Field number—89-DJ-60

Location—northern Pine Nut Mountains; lat 39°01'36"N., long 119°34'59"W.

Pluton name—Shamrock batholith

Sample description—Medium-grained, equigranular biotite-hornblende granodiorite. Color index is about 20-25. Hornblende locally contains clinopyroxene cores and is partially replaced by fine-grained biotite. K-feldspar is salmon colored.

Age—165 Ma (U-Pb; Dilles and Wright, 1988)

Sample number (table 1)—65

Field number—89-DJ-61

Location—northern Pine Nut Mountains; lat 39°03'34"N., long 119°32'55"W.

Pluton name—Sunrise Pass pluton

Sample description—Medium-grained, hypidomorphic granular biotite-hornblende granodiorite. Color index is about 10-12 and mostly consists of subhedral to euhedral hornblende. K-feldspar forms small salmon-colored phenocrysts as much as 7 mm long.

Age—approx. 172 Ma (U-Pb; Dilles and Wright, 1988)

Sample number (table 1)—66

Field number—89-DJ-62

Location—northern Pine Nut Mountains; lat 39°03'32"N., long 119°32'49"W.

Pluton name—porphyry intrusion in volcanics of Fulstone Spring

Sample description—Fine- to medium-grained, flow-foliated hornblende granodiorite porphyry. Consists of 5-10 percent, 0.5-5 mm phenocrysts of plagioclase, hornblende, and quartz in felty to microcrystalline groundmass. Contains abundant fine-grained hydrothermal(?) green biotite in groundmass. Flow foliation defined by subparallel alignment of hornblende phenocrysts.

Age—approx. 166 Ma (U-Pb; Dilles and Wright, 1988)

Sample number (table 1)—67

Field number—89-DJ-63

Location—northern Pine Nut Mountains; lat 39°03'16"N., long 119°32'37"W.

Pluton name—Sunrise Pass pluton

Sample description—Medium- to coarse-grained, subporphyritic hornblende granodiorite containing small amount of fine-grained groundmass. Color index is about 12-15. K-feldspar forms small (<1 cm) poikilitic phenocrysts. Abundant fine-grained sphene.

Age—approx. 172 Ma (U-Pb; Dilles and Wright, 1988)

Table 2. Sample locations and descriptions—Continued

Sample number (table 1)—68

Field number—89-DJ-64

Location—northern Pine Nut Mountains; lat 39°02'58"N., long 119°32'42"W.

Pluton name—Yerington batholith

Sample description—Fine-grained, equigranular, hypidomorphic granular biotite-hornblende granodiorite or quartz monzodiorite. Color index is about 15-17 and consists mostly of subhedral hornblende locally with clinopyroxene cores. Abundant fine-grained sphene. Plagioclase partially altered to sericite + epidote.

Age—167-166 Ma (U-Pb; Dilles and Wright, 1988)

Sample number (table 1)—69

Field number—89-DJ-67

Location—northern Pine Nut Mountains; lat 39°02'46"N., long 119°32'40"W.

Pluton name—porphyry intrusion in volcanics of Fulstone Spring

Sample description—Fine- to medium-grained hornblende granodiorite porphyry containing 1-5 mm phenocrysts of plagioclase, hornblende, quartz, and biotite in microcrystalline groundmass. Plagioclase altered to sericite ± epidote and hornblende and biotite altered to epidote + iron oxides ± sericite. Contains small patches of piemontite in groundmass.

Age—approx. 166 Ma (U-Pb; Dilles and Wright, 1988)

Sample number (table 1)—70

Field number—89-DJ-69

Location—northern Pine Nut Mountains; lat 39°03'47"N., long 119°39'51"W.

Pluton name—unnamed diorite

Sample description—Fine-grained, hypidomorphic granular augite-hornblende monzodiorite. Color index is about 25-30 and consists of subhedral yellow-brown hornblende and subhedral augite that are both rimmed and partially replaced by blue-green hornblende. Contains abundant fine-grained sphene.

Age—Middle Jurassic(?)

Sample number (table 1)—71

Field number—89-DJ-70

Location—northern Pine Nut Mountains; lat 39°03'44"N., long 119°39'51"W.

Pluton name—Shamrock batholith

Sample description—Fine- to medium-grained, hypidomorphic granular biotite-hornblende granodiorite. Rock has been recrystallized with plagioclase overgrown and partially replaced(?) by fine-grained biotite, biotite recrystallized to finer-grained crystals, and abundant blue-green hydrothermal(?) hornblende. Color index is about 25-30. Abundant epidote + chlorite veinlets with bleached selvages.

Age—165 Ma (U-Pb; Dilles and Wright, 1988)

Sample number (table 1)—72

Field number—89-DJ-72

Location—northern Pine Nut Mountains; lat 39°03'22"N., long 119°42'27"W.

Pluton name—unnamed diorite

Sample description—Fine-grained, equigranular hornblende diorite. Color index is about 30. Cut by abundant epidote + actinolite veinlets with bleached selvages.

Age—Middle Jurassic(?)

Sample number (table 1)—73

Field number—89-DJ-73

Location—northern Pine Nut Mountains; lat 39°05'30"N., long 119°40'40"W.

Pluton name—Prison Hill pluton

Sample description—Medium- to coarse-grained hornblende-biotite granodiorite porphyry. Contains about 70 percent seriate phenocrysts of plagioclase, K-feldspar, quartz, biotite, and hornblende set in 0.05-0.2 mm allotriomorphic granular granitic groundmass. Color index is about 10-12 and consists of subhedral biotite and hornblende in subequal abundances.

Age—Cretaceous(?)

Table 2. Sample locations and descriptions—Continued

Sample number (table 1)—74

Field number—89-DJ-74

Location—northern Pine Nut Mountains; lat 39°06'26"N., long 119°40'52"W.

Pluton name—Prison Hill pluton

Sample description—Medium-grained, hypidomorphic granular hornblende-biotite granodiorite containing small (<1 cm) K-feldspar oikocrysts. Color index is about 10-12.

Age—Cretaceous(?)

Sample number (table 1)—75

Field number—89-DJ-75

Location—northern Pine Nut Mountains; lat 39°06'28"N., long 119°40'55"W.

Pluton name—unnamed diorite

Sample description—Hornfelsed, fine- to medium-grained biotite-hornblende quartz diorite. Color index is about 40-50 mostly comprised of fine-grained hornblende with coarser (3-4 mm) flakes of biotite. Rock has been thermally recrystallized.

Age—Middle Jurassic(?)

Sample number (table 1)—76

Field number—89-DJ-76

Location—northern Pine Nut Mountains; lat 39°08'14"N., long 119°37'03"W.

Pluton name—Sunrise Pass pluton

Sample description—Fine- to medium-grained, hypidomorphic granular hornblende granodiorite. Color index is about 15-17. Hornblende crystals commonly contain clinopyroxene cores. K-feldspar forms small (<5 mm) pink colored phenocrysts. Contains abundant fine-grained sphene.

Age—approx. 172 Ma (U-Pb; Dilles and Wright, 1988)

Sample number (table 1)—77

Field number—89-DJ-77

Location—northern Pine Nut Mountains; lat 39°08'48"N., long 119°36'22"W.

Pluton name—Sunrise Pass pluton

Sample description—Medium- to coarse-grained, hypidomorphic granular, sparsely porphyritic biotite-hornblende granodiorite. Color index about 15 consisting mostly of subhedral poikilitic hornblende that is partially replaced by biotite. Pink colored K-feldspar forms scattered phenocrysts as long as 1 cm. Abundant sphene.

Age—approx. 172 Ma (U-Pb; Dilles and Wright, 1988)

Sample number (table 1)—78

Field number—89-DJ-78

Location—northern Pine Nut Mountains; lat 39°09'25"N., long 119°36'47"W.

Pluton name—Sunrise Pass pluton

Sample description—Medium-grained, porphyritic biotite-hornblende granodiorite. Pink colored K-feldspar forms scattered phenocrysts as long as 1 cm. Abundant sphene. Color index is about 12-15.

Age—approx. 172 Ma (U-Pb; Dilles and Wright, 1988)

Sample number (table 1)—79

Field number—89-DJ-79

Location—northern Pine Nut Mountains; lat 39°09'54"N., long 119°36'43"W.

Pluton name—Sunrise Pass pluton

Sample description—Medium- to coarse-grained, porphyritic biotite-hornblende granodiorite. Contains abundant pink K-feldspar phenocrysts as long as 1.5 cm. Color index is about 10-12. Contains abundant fine-grained sphene.

Age—approx. 172 Ma (U-Pb; Dilles and Wright, 1988)

Table 2. Sample locations and descriptions—Continued

Sample number (table 1)—80

Field number—89-DJ-84

Location—northern Pine Nut Mountains; lat 38°59'02"N., long 119°34'49"W.

Pluton name—Shamrock batholith

Sample description—Medium-grained, hypidomorphic granular hornblende-biotite granodiorite containing small (5-6 mm) K-feldspar phenocrysts. Color index is about 12-15.

Age—approx. 165 Ma (U-Pb; Dilles and Wright, 1988)

Sample number (table 1)—81

Field number—89-DJ-85

Location—northern Pine Nut Mountains; lat 38°59'04"N., long 119°27'49"W.

Pluton name—Shamrock batholith

Sample description—Strongly altered, medium- to coarse-grained granodiorite. Mafic minerals (mostly(?) hornblende) constituted about 15 percent of rock and are replaced clinopyroxene + sphene. Plagioclase is bleached and partially altered to sericite ± clay. K-feldspar is salmon colored.

Age—approx. 165 Ma (U-Pb; Dilles and Wright, 1988)

Sample number (table 1)—82

Field number—89-DJ-88

Location—northern Pine Nut Mountains; lat 38°58'45"N., long 119°27'35"W.

Pluton name—Shamrock batholith

Sample description—Medium- to coarse-grained, hypidomorphic granular biotite-clinopyroxene-hornblende granodiorite. Color index is about 15-17 and consists of coarse-grained (as much as 5-7 mm across) skeletal biotite flakes, clinopyroxene, and poikilitic hornblende which partially replaces clinopyroxene. K-feldspar forms coarse-grained perthitic oikocrysts. Plagioclase is moderately to strongly sericitized.

Age—approx. 165 Ma (U-Pb; Dilles and Wright, 1988)

Sample number (table 1)—83

Field number—89-DJ-91

Location—northern Pine Nut Mountains; lat 38°57'49"N., long 119°27'25"W.

Pluton name—Shamrock batholith

Sample description—Strongly altered, medium-grained hypidomorphic granular hornblende granodiorite. Hornblende replaced by pale green clinopyroxene + sphene. Pink colored K-feldspar forms subhedral crystals and locally partially replaces and overgrows plagioclase. Plagioclase is bleached and partially altered to sericite + clay.

Age—approx. 165 Ma (U-Pb; Dilles and Wright, 1988)

Sample number (table 1)—84

Field number—89-DJ-92

Location—northern Pine Nut Mountains; lat 38°56'44"N., long 119°28'03"W.

Pluton name—Shamrock batholith

Sample description—Medium-grained, hypidomorphic granular biotite(?)—hornblende granodiorite. Moderately altered with hornblende replaced by pale colored actinolite, biotite(?) replaced by actinolite + sphene, and plagioclase weakly to strongly altered to sericite. Abundant sphene.

Age—approx. 165 Ma (U-Pb; Dilles and Wright, 1988)

Sample number (table 1)—85

Field number—89-DJ-93

Location—northern Pine Nut Mountains; lat 39°04'06"N., long 119°33'08"W.

Pluton name—Sunrise Pass pluton

Sample description—Medium-grained porphyritic biotite-hornblende granodiorite containing 3-7 mm pink K-feldspar phenocrysts. Color index is about 12-15. Abundant fine-grained sphene. Plagioclase moderately altered to clay + sericite.

Age—approx. 172 Ma (U-Pb; Dilles and Wright, 1988)

Table 2. Sample locations and descriptions—Continued

Sample number (table 1)—86

Field number—89-DJ-94

Location—northern Pine Nut Mountains; lat 39°05'11"N., long 119°32'33"W.

Pluton name—Sunrise Pass pluton

Sample description—Medium- to coarse-grained, porphyritic biotite-hornblende granodiorite. Contains abundant pink K-feldspar phenocrysts as much as 1 cm long. Abundant sphene.

Age—approx. 172 Ma (U-Pb; Dilles and Wright, 1988)

Sample number (table 1)—87

Field number—89-DJ-95

Location—northern Pine Nut Mountains; lat 39°05'16"N., long 119°31'33"W.

Pluton name—Sunrise Pass pluton

Sample description—Medium-grained, porphyritic biotite-hornblende granodiorite. Contains abundant pink K-feldspar phenocrysts as much as 1.5 cm long. Color index is about 15. Hornblende is poikilitic with numerous biotite inclusions.

Age—approx. 172 Ma (U-Pb; Dilles and Wright, 1988)

Sample number (table 1)—88

Field number—89-DJ-96

Location—northern Pine Nut Mountains; lat 39°05'20"N., long 119°27'47"W.

Pluton name—Sunrise Pass pluton

Sample description—Medium- to coarse-grained, hypidomorphic granular, coarsely porphyritic biotite-hornblende granodiorite containing about 25 percent pink colored K-feldspar phenocrysts as much as 1.5 cm long. Color index is about 15-17. Poikilitic hornblende crystals contain abundant biotite inclusions. Abundant sphene.

Age—approx. 172 Ma (U-Pb; Dilles and Wright, 1988)

Sample number (table 1)—89

Field number—89-DJ-97

Location—northern Pine Nut Mountains; lat 39°05'20"N., long 119°27'47"W.

Pluton name—Yerington batholith

Sample description—Strongly altered, fine-grained, hypidomorphic granular granodiorite or quartz monzodiorite.

Mafic minerals replaced by chlorite + epidote + calcite and plagioclase partially replaced by sericite + clay.

Age—167-166 Ma (U-Pb; Dilles and Wright, 1988)

Sample number (table 1)—90

Field number—89-DJ-100

Location—northern Pine Nut Mountains; lat 39°03'46"N., long 119°25'13"W.

Pluton name—porphyry intrusion in volcanics of Fulstone Spring

Sample description—Coarsely porphyritic, flow-foliated granodiorite porphyry. Phenocrysts comprised of about 10-15 percent 2-3 mm white plagioclase, 0-10 percent pink K-feldspar as long as 2 cm, 7-10 percent flow aligned hornblende as long as 2 mm, and sparse 1-2 mm resorbed quartz. Groundmass is microcrystalline felsite. Hornblende is mostly altered to iron oxides.

Age—approx. 166 Ma (U-Pb; Dilles and Wright, 1988)

Sample number (table 1)—91

Field number—89-DJ-101

Location—northern Pine Nut Mountains; lat 39°04'19"N., long 119°25'08"W.

Pluton name—quartz monzodiorite porphyry

Sample description—Medium- to coarse-grained quartz monzodiorite porphyry containing about 20 percent white plagioclase laths as long as 5-6 mm, 10-15 percent acicular hornblende as long as 7 mm, 1-2 percent biotite, and sparse resorbed quartz in fine-grained granitic groundmass. Plagioclase locally strongly altered to sericite + epidote and epidote locally forms patches in groundmass.

Age—approx. 165 Ma (U-Pb; Dilles and Wright, 1988)

Table 2. Sample locations and descriptions—Continued

Sample number (table 1)—92

Field number—89-DJ-102

Location—northern Pine Nut Mountains; lat 39°05'13"N., long 119°32'30"W.

Pluton name—Sunrise Pass pluton

Sample description—Medium- to coarse-grained, coarsely porphyritic biotite-hornblende granodiorite. Contains about 20 percent pink K-feldspar phenocrysts as long as 2 cm. Color index is about 10-12. Abundant sphene.

Age—approx. 172 Ma (U-Pb; Dilles and Wright, 1988)

Sample number (table 1)—93

Field number—89-DJ-103

Location—northern Pine Nut Mountains; lat 39°03'49"N., long 119°32'22"W.

Pluton name—Sunrise Pass pluton

Sample description—Strongly altered, medium-grained hypidomorphic granular granodiorite. Contains about 5 percent mafic minerals that are replaced by pale blue-green hornblende. Plagioclase bleached and locally altered to clay(?). Local epidote veinlets. Abundant sphene.

Age—approx. 172 Ma (U-Pb; Dilles and Wright, 1988)

Sample number (table 1)—94

Field number—89-DJ-104

Location—northern Pine Nut Mountains; lat 39°03'00"N., long 119°31'10"W.

Pluton name—porphyry intrusion in volcanics of Fulstone Spring

Sample description—Strongly altered, fine- to medium-grained granodiorite porphyry. Phenocrysts comprised of 10-15 percent medium-grained plagioclase and 5 percent hornblende(?) which is replaced by epidote. Microcrystalline groundmass largely replaced by pale green-brown biotite(?). Abundant epidote in groundmass.

Age—approx. 166 Ma (U-Pb; Dilles and Wright, 1988)

Sample number (table 1)—95

Field number—89-DJ-105

Location—northern Pine Nut Mountains; lat 39°03'00"N., long 119°31'10"W.

Pluton name—Yerington batholith

Sample description—Strongly altered, fine-grained, hypidomorphic granular granodiorite. Color index is about 15-20. Mafic minerals replaced by pale blue-green hornblende, green biotite, and epidote. Plagioclase strongly altered to sericite. Patches of epidote in groundmass.

Age—167-166 Ma (U-Pb; Dilles and Wright, 1988)

Sample number (table 1)—96

Field number—CHM-26

Location—Chalk Mountain; lat 39°19'10"N., long 118°07'27"W.

Pluton name—Chalk Mountain pluton

Sample description—Medium- to coarse-grained granodiorite

Age—26 Ma (K-Ar; S.B. Keith, written commun, 1990)

Sample number (table 1)—97

Field number—CHM-33

Location—Chalk Mountain; lat 39°20'18"N., long 118°07'01"W.

Pluton name—Chalk Mountain pluton

Sample description—Porphyritic granodiorite

Age—26 Ma (K-Ar; S.B. Keith, written commun, 1990)

Table 2. Sample locations and descriptions—Continued

Sample number (table 1)—98

Field number—CHM-34

Location—Chalk Mountain; lat 39°20'26"N., long 118°06'51"W.

Pluton name—Chalk Mountain pluton

Sample description—Granodiorite porphyry

Age—26 Ma (K-Ar; S.B. Keith, written commun, 1990)

Sample number (table 1)—99

Field number—LAP-08

Location—La Plata Canyon; lat 39°25'35"N., long 118°18'00"W.

Pluton name—La Plata Canyon pluton

Sample description—Fine-grained leucocratic granite

Age—approx. 84 Ma (K-Ar; John and Silberling, in press)

Sample number (table 1)—100

Field number—LAP-14A

Location—La Plata Canyon; lat 39°25'35"N., long 118°17'52"W.

Pluton name—La Plata Canyon pluton

Sample description—Fresh granodiorite

Age—approx. 84 Ma (K-Ar; John and Silberling, in press)